

Amateur Television Journal

**August, 2024
issue #167**

BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com



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BCARES fire video via W0BTV-TV in Boulder County EOC

**Another Big Forest Fire in Boulder County !
Plus Several More Burning Nearby !**



Mon, 7/29, Alexander Mtn. Loveland Fire



Tues, 7/30, Stone Canyon Fire, near Lyons, Colorado, 4:30pm



W0BTV-TRV -- Lyons Fire @ 7 pm



W0BTV-TRV -- Lyons Fire @ 9 pm

Hot-Dry Summer = Forest Fires This week (July-Aug) is a bad one for the Colorado Front Range. On Monday, 7/29, the Alexander Mtn. fire erupted just west of Loveland, CO in Larimer County, just north of Boulder County. Then on Tuesday, 7/30, we got hit with the Stone Canyon fire near Lyons on the northern border of Boulder County. Next on Wed, 7/31, Boulder County got it's second big fire. This time at Gross Reservoir west of the city of Boulder. Plus a fire in Jefferson County to the south of us and others.

For the Lyons fire, BCARES was able to provide a live video feed of the fire for the Boulder County Emergency Operations Center (EOC). See the above photo on p. 1. This was from BCARES member KH6HTV's QTH out on the eastern prairie. It was about 20 miles to the south-east from the fire. He used the long telephoto lens capability of his CANON camcorder, plus the night vision mode for video during the night. By the following morning, the video images had become unusable due to the intense, lingering smoke covering the entire county. Thus, the video feed was shut down.

Hi Jim --- Thank you for the pictures of the Stone Canyon fire on Tuesday. One of our daughters and her family live a few miles north of the fire and have their family business in that area along with relatives. They, of course, had been evacuated and were staying at our house. It was nice for them to watch your live pictures of the fire. Our six year old granddaughter was especially intrigued. Thank You for all your support.

73 de George and Doshia Kretke, N0RUX & KB0NAS



Allen, K0ARK, BCARES E.C. & Chairman



BCARES is Awarded a Grant of \$30,000 !

Recently Allen Bishop, K0ARK, E.C. of Boulder County Amateur Radio Emergency Services (BCARES) announced to the membership that we had been awarded a two year grant of \$30,000 from Boulder County. The funds come from a new, 0.1% sales tax authorized by voters in 2022. It was called proposition 1B: Emergency Services Sales and Use Tax and Revenue Change. The new sales tax was to help fund volunteer emergency services, such as volunteer fire departments., mountain rescue, search & rescue, etc. In 2022, Sheriff Johnson and OEM director Chard had both encouraged Allen to submit a proposal for funding for BCARES. We did not get any in 2022 as the committee charged with deciding upon the distribution of the tax revenues opted to fund only volunteer fire depts. in 2022, but they encouraged BCARES to resubmit our application again in 2023. This time, Allen's application was successful. Included in Allen's proposal was to repair and upgrade our existing network of mountain and plains FM voice repeaters; implement the proposed microwave VOIP system to tie together front range EOCs; and add two more DATV repeaters to enhance the coverage of Boulder County. The first new DATV repeater is slated to be installed at a city of Lafayette police dept. radio site to provide coverage of the south-east part of the county, including the cities of Lafayette and Louisville which are now shadowed from the W0BTV, Boulder NCAR repeater by Davidson Mesa. Due to the slow moving gears of any government, Allen does not actually expect to receive the funds until this fall.

 This ATV electronic newsletter was formerly entitled "**TV Repeater's Repeater**" for issues #1 through 165. It is a publication of the Boulder Amateur Television Club, Boulder, Colorado. It started six years ago in July, 2018 strictly as a club newsletter for it's own 20 some members. Since then it has grown in popularity to become the "de-facto" ATV Journal for a large number of ATV ham through out the USA. Plus it now has a sizeable base of readers, plus contributing authors from overseas. Hence the new name of **Amateur Television Journal**.

Feed-Back on New Name:

Aloha Jim --- I like your new newsletter name. I am on Pitcairn Island, been hear about two months. I will be heading back to California on the 28th. DX to Europe is very good. USA not bad either but Europe has stronger signals. Using 100 watts on my Icom IC-706 MK-II and an inverted vee at about 24 feet.
 73, Mike VP6MC - WA6SVT, ATN

Jim -- Great that you made the newsletter change... I am certain that this change should be received positively by the ATV community!
 Cheers, Dave, AH2AR, DARA

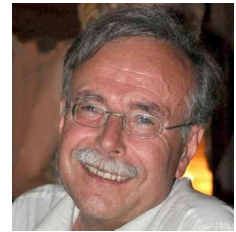
Hi Jim! -- Love the new title for the newsletter! Great job on this issue.

73, Roland, KC6JPG, ATN



KC6JPG

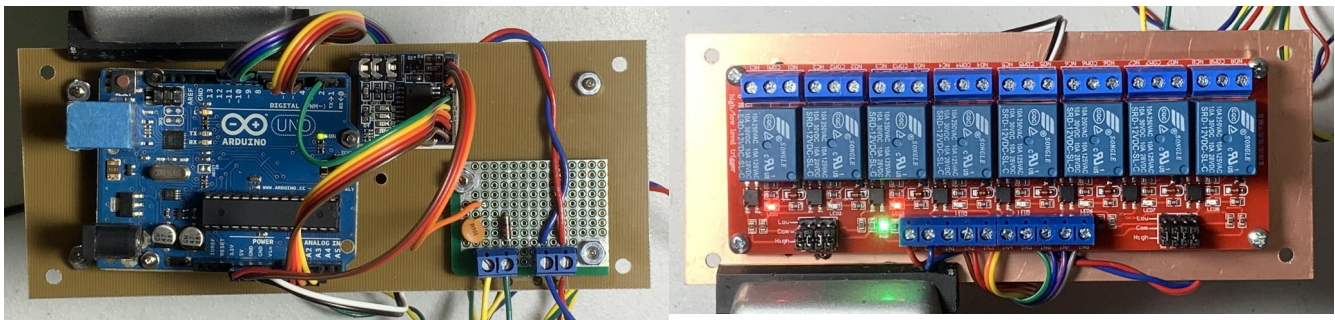
Dear Jim -- It was certainly a good decision to rename the "TV Repeater's Repeater" to "Amateur Television Journal". This makes quoting in magazines easier and more comprehensible.



DH6MAV

Many thanks, by the way, for the reproduction of my "slightly criminal" article in issue 166. The readers should also have something to laugh about. And it lightens up our otherwise so strictly technical treatises. May it also be an inspiration for others to send in something similar.

Vy 73, Klaus Welter, DH6MAV, Hofstetten-Hagenheim . <https://www.qrz.com/db/DH6MAV>



NEW DTMF Decoder / Relay Board

Thanks to Bill, AB0MY, we now have a new, modern addition to the Boulder ATV repeaters. Bill has designed and donated the above DTMF (Touch-Tone) decoder and relay board. It is based upon an Arduino micro-computer board. Bill also found available a small dedicated DTMF board, plus another pc board with eight relays, including the drivers. Bill packaged it onto both sides of a bare board matching the footprint of the old Intuitive Circuits DTMF-8 board. He says the total parts cost was about \$50. One of the advantages of this approach is now by custom programming the Arduino, one is able to have any desired combination of relay functions, etc. and not be constrained to the few choices on the old DTMF-8. Bill programmed ours to have a three digit password for access. Then seven of the relays were programmed as independent latching relays. Relay #8 was programmed to be our RESET command relay. It resets relays # 1-7 all back to the zero state. It closes for a fixed time interval of 15 seconds, then opens again. We will use this to disconnect the DC power and thus reboot all of the various digital devices in the repeater.

Possible Antenna Configuration for a Portable ATV Repeater

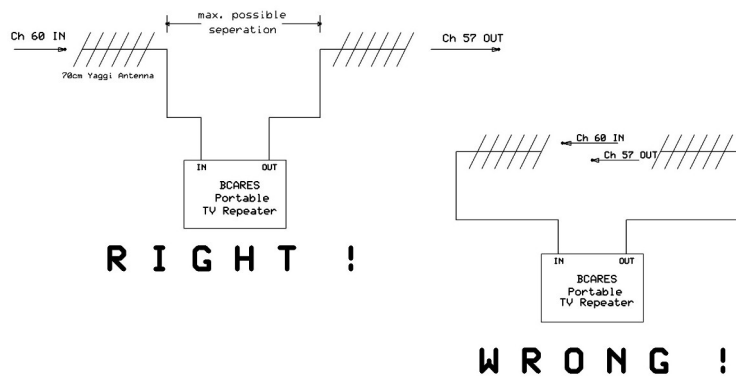
Jim, KH6HTV

BCARES has a portable, in-band, 70cm, DATV repeater. We have reported on it in a previous issue (#137, July, 2023) of this newsletter. The portable repeater system is not yet complete as we still need to furnish it with suitable 70 cm antennas. For such a repeater, we would typically use a pair of antennas. However, placement becomes critical. For a repeater to be successful, we require a whole lot of isolation between the two antennas.

If the hams sent out in the field to deploy the portable repeater are not really RF savvy, we could easily end up with the situation shown below. If the two yagi antennas are pointing at each other, we don't have isolation, but direct high gain coupling



Combo 70cm Whip & Yagi Antennas

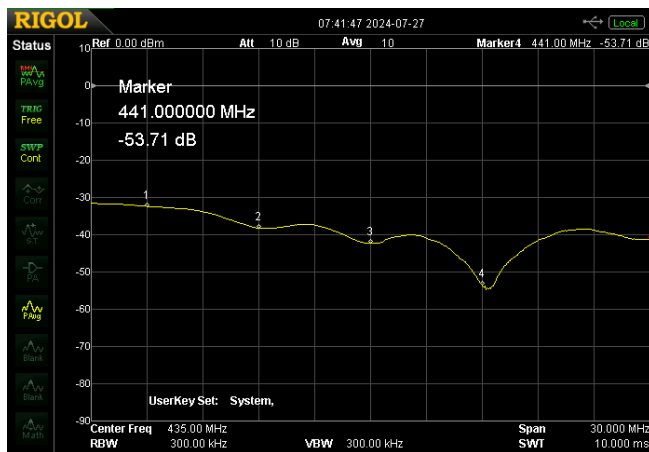


and we will end up with a high powered, motor-boating oscillator. Even having them back to back requires considerable separation to provide sufficient isolation. If the yagis are not 180 deg apart, but some other intermediate angle, then the side lobes will start to dominate and determine the coupling. Not a good situation in general for novices.

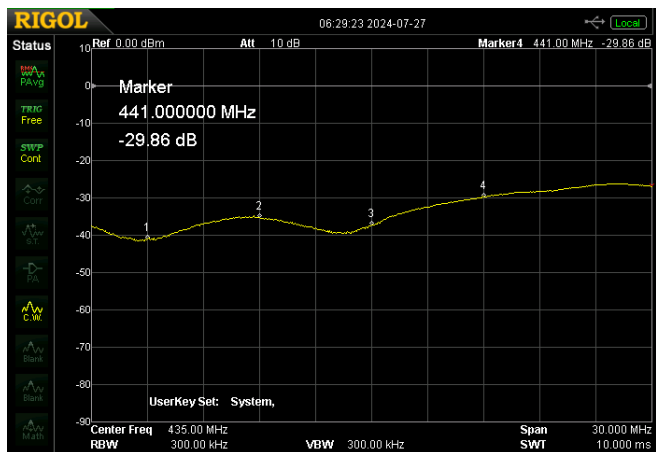
Using an on-line calculator, with two simple, 70 cm, $1/4 \lambda$ whip antennas, what horizontal separation would we need to obtain -30 dB of isolation? The answer is 6 ft. 20 ft. for -40 dB.

How about vertical separation? 2.5 ft. gives -30 dB and 4.5 ft. gives -40 dB.

OK, now my suggestion would be to instead use the arrangement shown in the above photo. This consists of a directional yagi antenna co-located on the same mast with a vertical, omni, whip antenna. Could this possibly work? It does have the advantage of only requiring a single antenna tripod and mast. Plus it should be more of a KISS solution for untrained volunteer hams to deploy.



Antenna Isolation with 25 cm separation



Antenna Isolation with 50 cm separation

Above S21 Isolation plots are sweep from 420 to 450 MHz, 3 MHz/div horizontal & 10 dB/div. vertical

The antennas shown which I used were an M-Squared, 6 element yagi and a Diamond X-2000, 2m/70cm/23cm mobile whip. I ran a set of experiments to actually measure the isolation between these two antennas. I used my Rigol DSA-815 spectrum analyzer with it's tracking generator. I had two, 50 ft. cables running from the ham shack to the antennas mounted on my back deck. I first

normalized the S21 setup by attaching the two cables together at the far end. I then attached them to the two antennas. I measured the resultant isolation over the entire 70 cm band. I then ran a set of measurements with various separations in 5 cm steps ranging from 25 to 55 cm. There was some variation depending upon the separation, plus in some cases a really sweet spot was noted at a particular frequency. But in no case was the isolation any worse than -30 dB. The plot on the left actually showed a really sweet spot isolation of -54 dB at 441 MHz for 25 cm separation.

I have also actually tested this configuration with a bench top, temporary, 5 Watt, DVB-T repeater lash-up. The repeater was set up for Ch 60 (441 MHz) input and Ch 57 (423 MHz) output. It used N0YE, inter-digital band-pass filters, Hi-Des modulator and receiver and a pre-amp. No desense was detected.

73 de Jim, KH6HTV, Boulder, Colorado

BCARES Demos DATV at Boy Scout Order of the Arrow Convention



Allen, K0ARK, with his DATV demo



W1BSA/0 HF Station



BCARES, 3 W, 70cm, DVB-T pack set (r)



M-Squared Yagi bore-sighted on W0BTV Repeater

For the past week, the University of Colorado campus has been crawling with over 6,000 Scouts, both boys and girls, plus 2,000 adult leaders. They were attending an Order of the Arrow national convention. The OA is an honor society for outstanding, older teenager Scouts. The campus headquarters for the event was at the Williams Village dormitory complex. Many activity and information tents were set up on the lawn at Williams Village. At each OA convention the Scouts also set up an HF station using the Boy Scout call sign, W1BSA. For this convention, BCARES was also invited to participate to introduce the Scouts to ARES as another way of providing service to their communities. To stimulate interest, BCARES opted to demo it's unique capability in providing live, high-definition video to it's served public safety agencies. Our BCARES' EC and chairman, Allen Bishop, K0ARK, organized the operation. ATVers and BCARES members, Pete, WB2DVS, and Bill, AB0MY, assisted. They set up one of the BCARES, ATV pack sets. It is a complete, self-contained rugged enclosure with a 70 cm, 3 Watt, DVB-T transmitter. To complete the demo, they beamed a DTV signal from the CU campus to the W0BTV, ATV repeater, on Ch. 60 (441 MHz). Then with a separate antenna they then received the repeater's signal coming back on Ch 57 (423 MHz). The repeater's signal was also being simultaneously streamed by both N0YE and AB0MY over the inter-net via the BATC server in the U.K. This was also displayed on PC computers both in the demo tent and inside the dormitory complex.

W0BTV Details: Inputs: 23 cm Primary (CCARC co-ordinated) + 70 cm secondary all digital using European Broadcast TV standard, DVB-T 23cm, 1243 MHz/6 MHz BW (primary), plus 70cm (secondary) on 441 MHz with 2 receivers of 6 & 2 MHz BW
Outputs: 70 cm Primary (CCARC co-ordinated), Channel 57 -- 423 MHz/6 MHz BW, DVB-T Also, secondary analog, NTSC, FM-TV output on 5.905 GHz (24/7 microwave beacon).
Operational details in AN-51c Technical details in AN-53c. Available at:
<https://kh6htv.com/application-notes/>

W0BTV ATV Net: We hold a social ATV net on Thursday afternoon at 3 pm local Mountain time (22:00 UTC). The net typically runs for 1 to 1 1/2 hours. A DVD ham travelogue is usually played for about one hour before and 1/2 hour after the formal net. ATV nets are streamed live using the British Amateur TV Club's server, via: <https://batc.org.uk/live/> Select *ab0my or n0ye*. We use the Boulder ARES (BCARES) 2 meter FM voice repeater for intercom. 146.760 MHz (-600 kHz, 100 Hz PL tone required to access).

Newsletter Details: This is a free ATV newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 800+, both in the USA and overseas. News and articles from other ATV groups are welcomed. Permission is granted to re-distribute it and also to re-print articles, as long as you acknowledge the source. All past issues are archived at: <https://kh6htv.com/newsletter/>

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